

**Claims**

1. An authoring method for use in creating an audiovisual product, comprising the steps of:

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defining a plurality of components, the components implicitly representing functional sections of audiovisual content with respect to one or more raw content objects, and a plurality of transitions that represent movements  
10 between the plurality of components;

expanding the plurality of components and the plurality of transitions to provide a set of explicitly realised AV assets and an expanded intermediate data  
15 structure of nodes and links, where each node is associated with an AV asset of the set and the links represent movement from one node to another;

creating an audiovisual product in a predetermined  
20 output format, using the AV assets and the expanded intermediate data structure of the nodes and the links;  
and

testing the audiovisual product.

25 2. The method of claim 1, wherein the defining step comprises defining at least one information component that comprises a reference to a raw content object.

30 3. The method of claim 2, wherein the reference denotes a file path to a location where the raw content object is stored.

4. The method of any preceding claim, wherein the defining step comprises defining at least one choice component comprising a reference to at least one raw content object, and at least one authoring parameter.

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5. The method of claim 4, wherein the at least one authoring parameter is adapted to control a selection or modification of the at least one raw content object.

10 6. The method of claim 4 or 5, wherein the at least one authoring parameter comprises a runtime variable available during playback of the audiovisual product.

15 7. The method of claim 4, 5 or 6, wherein the at least one authoring parameter comprises an authoring-only parameter that will not be available during playback of the audiovisual product.

20 8. The method of any of claims 4 to 7, wherein the choice component comprises a reference to a presentation template and a reference to at least one substitutable raw content object to be placed in the template according to the at least one authoring parameter.

25 9. The method of any preceding claim, wherein the defining step comprises defining at least one meta-component representing a set of components and transitions.

30 10. The method of claim 9, wherein the at least one meta-component is a procedurally defined representation of the set of components and transitions.

11. The method of any preceding claim, wherein each transition represents a permissible movement from one component to another component.

5 12. The method of any preceding claim, wherein each transition is associated with a triggering event.

13. The method of claim 12, wherein the triggering event is an event occurring during playback of the  
10 audiovisual product.

14. The method of claim 13, wherein the triggering event is receiving a user command, or expiry of a timer.

15 15. The method of any preceding claim, further comprising the step of checking expected conformance of the audiovisual product with the predetermined output format, using the plurality of components and the plurality of transitions.

20 16. The method of claim 15, wherein the predetermined output format is a hierarchical data structure having limitations on a number of objects that may exist in the data structure at each level of the  
25 hierarchy, and the checking step comprises predicting an expected number of objects at a level and comparing the expected number with the limitations of the hierarchical data structure.

30 17. The method of claim 15 or 16, wherein the checking step comprises predicting an expected total size of the audiovisual product, and comparing the expected

total size against a storage capacity of a predetermined storage medium.

18. The method of any preceding claim, wherein the  
5 expanding step comprises, for each component, building one or more of the set of explicitly realised AV assets by reading and manipulating the one or more raw content objects.

10 19. The method of any preceding claim, wherein:

the defining step comprises defining at least one choice component comprising a reference to a plurality of raw content objects and at least one authoring parameter;  
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the building step comprises:

selecting one or more raw content objects from  
20 amongst the plurality of raw content objects using the at least one authoring parameter; and

combining the selected raw content objects to form one of the AV assets.

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20. The method of claim 19, comprising repeating the selecting and combining steps to automatically build a plurality of the explicitly realised AV assets from the one of the components.

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21. The method of any preceding claim, wherein the expanding step comprises:

creating from each one of the plurality of components one or more explicitly realised AV assets to provide the set of AV assets;

5 creating the expanded intermediate data structure wherein each node represents one AV asset of the set; and

creating a set of links between the nodes.

10 22. The method of any preceding claim, wherein each transition is associated between first and second components, and creating the set of links comprises evaluating each transition to create one or more links, each of the links being between a node created from the 15 first component and a node created from the second component.

23. The method of any preceding claim, wherein the expanding step comprises evaluating at least one of the 20 transitions to create exit logic associated with at least one first node, evaluating one of the components to create entry logic associated with at least one second node, and providing a link between the first and second nodes according to the entry logic and the exit logic.

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24. The method of claim 23, wherein at least one of the transitions is associated with a triggering event, and the expanding step comprises evaluating the triggering event to determine the exit logic associated with the at 30 least first one node.

25. The method of any preceding claim, further comprising the step of checking expected conformance of

the audiovisual product with the predetermined output format, using the AV assets and the expanded intermediate data structure of nodes and links.

5 26. The method of claim 25, wherein the predetermined output format is a hierarchical data structure having limitations on a number of objects that may exist in the data structure at each level of the hierarchy, and the checking step comprises predicting an  
10 expected number of objects at a level and comparing the expected number with the limitations of the hierarchical data structure.

27. The method of claim 26, wherein the checking step comprises predicting an expected total size of the audiovisual product, and comparing the expected total size against a storage capacity of a predetermined storage medium.

20 28. The method of any preceding claim, wherein the AV assets have a data format specified according to the predetermined output format.

25 29. The method of any preceding claim, wherein the AV assets each have a data format according to the predetermined output format, whilst the raw content objects are not limited to a data format of the predetermined output format.

30 30. The method of any preceding claim, wherein the predetermined output format is a DVD-video specification.

31. The method of any preceding claim, wherein the AV assets each comprise a video object, zero or more audio objects, and zero or more sub-picture objects.

5 32. The method of any preceding claim, wherein the AV assets each comprise at least one video object, zero to eight audio objects, and zero to thirty-two sub-picture objects, according to the DVD-video specification.

10 33. The method of any preceding claim, wherein the creating step comprises creating objects in a hierarchical data structure defined by the predetermined output format with objects at levels of the data structure, according to the intermediate data structure of nodes and links, and  
15 where the objects in the hierarchical data structure include objects derived from the explicitly realised AV assets.

34. The method of any preceding claim, wherein the predetermined output format is a DVD-video specification and the creating step comprises creating DVD-video structure locations from the nodes of the expanded intermediate data structure, placing the explicitly realised AV assets at the created structure locations, and  
25 substituting the links of the expanded intermediate data structure with explicit references to the DVD-video structure locations.

35. An authoring method for use in creating a DVD-video product, comprising the steps of:

creating a plurality of components representing parameterised sections of audiovisual content, and a

plurality of transitions representing movements between components;

5 expanding the plurality of components and the plurality of transitions to provide a set of AV assets and an expanded data structure of nodes and links, where each node is associated with an AV asset of the set and the links represent movement from one node to another;

10 creating a DVD-video format data structure from the AV assets, using the nodes and links; and testing the DVD-video format data structure.

15 36. The method of claim 35 or 36, comprising creating at least one information component comprising a reference to an item of AV content.

20 37. The method of claim 35, comprising creating at least one choice component comprising a reference to at least one item of AV content, and at least one parameter for modifying the item of AV content.

25 38. The method of claim 37, wherein the choice component comprises a reference to a presentation template and a reference to at least one item of substitutable content to be placed in the template according to the at least one parameter.

30 39. The method of claim 37 or 38, wherein the choice component comprises at least one runtime variable available during playback of an audiovisual product in a DVD player, and at least one authoring parameter not available during playback.

40. The method of any of claims 35 to 39, comprising creating at least one meta-component representing a set of components and transitions.

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41. The method of any of claims 35 to 40, wherein each transition represents a permissible movement from one component to another component, each transition being associated with a triggering event.

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42. The method of claim 41, wherein a triggering event includes receiving a user command, or expiry of a timer.

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43. The method of any of claims 35 to 42, wherein the expanding step comprises:

creating from each one of the plurality of components one or more AV assets to provide the set of AV assets;

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creating the expanded data structure wherein each node represents one AV asset of the set; and

creating a set of links between the nodes.

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44. The method of claim 37 or any claim dependent thereon, wherein the expanding step comprises evaluating each choice component to create a plurality of AV assets according to each value of the at least one parameter.

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45. The method of claim 44, wherein evaluating each choice component comprises creating entry logic associated with at least one node and/or evaluating at least one

transition to create exit logic associated with at least one node, and providing a link between a pair of nodes according to the entry logic and the exit logic.

5 46. The method of any of claims 35 to 45, comprising the step of checking expected conformance with the DVD-video format using the created components and transitions.

10 47. The method of any of claims 35 to 40, comprising the step of checking expected conformance with the DVD-video format using the set of AV assets and the expanded data structure of nodes and links.

15 48. An authoring method for use in creating an audiovisual product according to a DVD-video specification, comprising the steps of:

20 generating a set of AV assets each comprising a video object, zero or more audio objects and zero or more sub-picture objects, and an expanded data structure of nodes and links, where each node is associated with one AV asset of the set and the links represent navigational movement from one node to another; and

25 creating a DVD-video format data structure from the set of AV assets, using the nodes and links;

the method characterised by the steps of:

30 creating a plurality of components and a plurality of transitions, where a component implicitly defines a plurality of AV assets by referring to a presentation template and to items of raw content substitutable in the

presentation template, and the plurality of transitions represent navigational movements between components;

5 expanding the plurality of components and the plurality of transitions to generate the set of AV assets and the expanded data structure of nodes and links; and testing the set of AV assets and the expanded data structure of nodes and links.

10 49. A method as claimed in any preceding claim in which the step of testing comprises the steps of selecting and processing a data stream or audiovisual product, comprising data representing at least one of audiovisual data and identification data, to extract the 15 identification data, using the identification data to access an abstraction associated with the identification data; comparing the abstraction with an anticipated abstraction associated with a test plan; and outputting an indication of the result of the comparison.

20 50. A method as claimed in claim 49, in which the step of outputting comprises the step of creating a record of the comparison; the record providing an indication of whether or not the retrieved high-level abstraction matched the anticipated high-level abstraction.

25 51. A method as claimed in either of claims 49 and 50 in which the step of processing the data stream or audiovisual product comprises the step of extracting the identification data from a user field of an encoded elementary video stream.

30 52. A method as claimed in any of claims 49 to 51 in which the step of processing the data stream or audio

visual product comprises the step of identifying a current menu associated with the data stream or audio visual product.

53. A method as claimed in claim 52 further comprising  
5 the step of identifying menu option data, representing at least one option, associated with the current menu and invoking at the at least one option to select and process a next data stream or audiovisual product or portion thereof.

10 54. A method as claimed any of claims 49 to 53 further comprising the step of creating the test plan.

55. A method as claimed in claim 54 wherein the step of creating the test plan comprises the steps of creating at least one of an anticipated unique identifier, an  
15 abstraction anticipated as being associated with a unique identifier, an actual abstraction associated with the unique identifier, entry conditions or status information and command information.

56. A method as claimed in either of claims 54 and 55 in  
20 which the step of creating the test plan comprises the step of associating the identification data of the data stream or audiovisual product with an anticipated abstraction representing audiovisual content of the data stream or audiovisual product.

25 57. A method as claimed in any of claims 49 to 56 further comprising the step of creating an index comprising an identification data entry for storing a copy of the identification data, and at least a reference to a corresponding abstraction; and in which the step of  
30 comparing comprises the step of access the index using the

identification data as a key to identify the corresponding abstraction.

58. A method for testing audiovisual content substantially as described herein with reference to and/or 5 as illustrated in the accompanying drawings.

59. A system comprising means to implement a method as claimed in any preceding claim.

60. A program comprising executable code to implement a system or method as claimed in any preceding claim.

10 61. A program product comprising storage for storing a program as claimed in claim 60.

62. A DVD comprising presentation data and navigation data together with associated identification data.

15 63. A method of authoring a DVD; comprising the steps of generating a unique identifier for a respective video sequence and encoding the respective video sequence to comprise the unique identifier or to establish an association with the unique identifier.